

PSD?

JAN 24 1984

M/S 532

Alan Schuyler
ARCO Alaska, Incorporated
Post Office Box 360
Anchorage, Alaska 99510

Dear Mr. Schuyler:

We have reviewed the compliance test report for the Kuparuk River Unit PSD permit and conclude that the turbine and heater tested were in compliance with the PSD permit (No. PSD-X82-01) limitations for NO_x.

We do have a concern, however, regarding the oxygen content of the exhaust gas from the heater. We have noted that the oxygen content was very low which may very likely be causing higher than expected emissions of CO. We agree that it is desirable to maintain low oxygen levels for good NO_x control and good fuel efficiency but only up to a point. We contend that very low levels of oxygen in the 1 to 2% range will not only increase CO emissions but may contribute to an unsafe operating condition.

Condition 6(b) of the PSD permit requires good operation and maintenance and a periodic or continuous monitoring program for O₂ or CO as BACT for CO from the heaters. Therefore, we are requesting ARCO to provide information to comply with the BACT requirements of CO as described in the permit.

Also enclosed for your review is a copy of PEDCo Environmental, Inc.'s evaluation of the test report. If you have any questions about this evaluation please feel free to contact Paul Boys at (206) 442-1567 or Ray Nye of my staff at (206) 442-7154.

Sincerely,

Michael M. Johnston, Chief
Air Operations Section

Enclosure

cc: Dave Estes, ADEC
Kathy Pazera, AOO

Final:Nye:kaf:1/20/84:#5402X

USEPA REG



0000005

CONCURRENCES

SYMBOL	RCN						
SURNAME	NYE						
DATE	1/23/84						

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: January 10, 1984

SUBJECT: Review of the 1983 Prudhoe Bay Compliance Tests

FROM: Paul A. Boys, Senior Chemical Engineer
Field Operations and Technical Support Branch

TO: Mike Johnston, Chief
Air Operations Section

Thru: Dan Bodien, Team Leader
Technical Support Team

Based on a review of the source test report from Chemecology Corporation and the report evaluation by our contractor (PEDCo), I conclude that the turbine and heater tested were in compliance with the PSD permit limitations for NO_x. The test results and the PSD permit emission limits are shown below:

<u>Source</u>	<u>Test Results</u>	<u>Permit Limits</u>
Turbine CPF-1 (C2101C)	121 ppm at 15% O ₂	160 ppm at 15% O ₂
Heater DS-1Y	0.058 lb/10 ⁶ BTU	0.10 lb/10 ⁶ BTU

Bob Ressler of PEDCo pointed out a few relatively minor gaps in the test report. He was able to fill those gaps (primarily process operating data) from the information he obtained onsite during his observation of the tests. I am enclosing a copy of his evaluation of the test report with this memo.

I noticed one interesting point in the test report; that is, the oxygen content of the exhaust gas from the heater was only 0.1%. This is very low and may very likely be causing higher than expected emissions of CO. It is desirable to maintain low oxygen levels for good NO_x control and good fuel efficiency up to a point. However, below 1 to 2% oxygen the CO emissions begin to increase and an unsafe operating condition can exist at very low levels of oxygen. The PSD permit required good operation and maintenance and a periodic or continuous monitoring program for O₂ or CO as BACT for CO from the heaters. There is no information in the report related to this question. Therefore, I recommend that we request that ARCO/SOHIO provide information on how they intend to comply with the BACT requirements for CO as described in the PSD permit. (No compliance tests were required for CO as I recall.)

If you have any questions about this evaluation, please call me.

Enclosure

PEDCO ENVIRONMENTAL, INC.

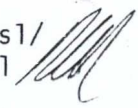
MEMORANDUM


TO: Project File

SUBJECT: Stack Test Report Review, ARCO
Alaska Petroleum Co., Kuparak
River Unit, Prudhoe Bay, AL -
PSD-X82-01

FILE: PN 3760-1-122

DATE: December 30, 1983

FROM: R. A. Ressler/
J. P. Paul 

cc: Paul Boys (2) 
T. C. Ponder, Jr.

Attached is our source test report evaluation summary for ARCO's Kuparak River Unit, Prudhoe Bay, Alaska. The tests were conducted on September 20-21, 1983, by Chemecology Corporation. ARCO tested Drill Site 1Y Heater DS-1Y and Turbine CPF-1 to demonstrate compliance with EPA Region X nitrogen oxides emission limits.

The report is an accurate description of the tests witnessed by Mr. Ressler and the results are accurately calculated based on the reported data; however, the report is incomplete since it does not contain: (1) a sketch of the process being tested showing the emission points; (2) a list of the qualifications for the persons involved in the testing; (3) the normal maximum operating level for the heater; and (4) calculations substantiating the report's claim that the heater at Drill Site Y1 operated at 50 percent capacity.

In order to complete our review we assumed or prepared the following: (1) sketches of Heater DS-1Y and Turbine CPF-1 that show the sample location in the exhaust stacks; (2) Mr. Ressler believes the test crew is qualified based, on his observations of their performance during the test; (3) based on Mr. Ressler's notes, the heater was operating normally. The heater is designed to heat oil from 32 wells (the maximum possible at the drill site) and only 16 are currently installed; and (4) Based on the reported 29,000 bbl/day oil flow, an assumed specific heat of the oil of 0.55 Btu/lb °F, a heater efficiency of 80 percent, and a density of 7.1 lb/gal, the heat input for the heater was 5×10^6 Btu/h (equivalent to the 50 percent of maximum reported). Therefore, our report evaluation is complete.

Nitrogen oxides emissions averaged 0.058 lb/million Btu from Heater DS-1Y and 121 ppm at 15 percent oxygen from Turbine CPF-1 (C2101C). The allowable nitrogen oxides emission rates are 0.10 lb/million Btu and 160 ppm at 15 percent oxygen, respectively. There were no visible emissions from the stacks at the time of the testing.

Also attached for your information are a series of photographs of the testing. Labels on each photograph identify the photograph subject.

SOURCE TEST REPORT EVALUATION SUMMARY

Reviewer J. P. Paul

Date December 21, 1983

Source Name ARCO Alaska, Inc.

Company Address Post Office Box 100360, Anchorage, Alaska 99510

Applicable Regulation PSD-X82-01

Affected Facility Heater DS-1Y, Turbine CPF-1 (C2101C)

Pollutants Tested Nitrogen oxides

Pretest Meeting Date _____ Test Dates Sept. 20 and 21, 1983

Authorized Deviation: None

Test Observers Present:

Name Robert A. Ressler Affiliation PEDCo Environmental, Inc.

Process Operating Parameters: Heater DS-1Y Turbine CPF-1

Designed	10 x 10 ⁶ Btu/h	14,400 hp
Normal maximum	5 x 10 ⁶ Btu/h	14,400 hp
Actual during test	5 x 10 ⁶ Btu/h	14,400 hp

Isokinetic Rates: Not applicable

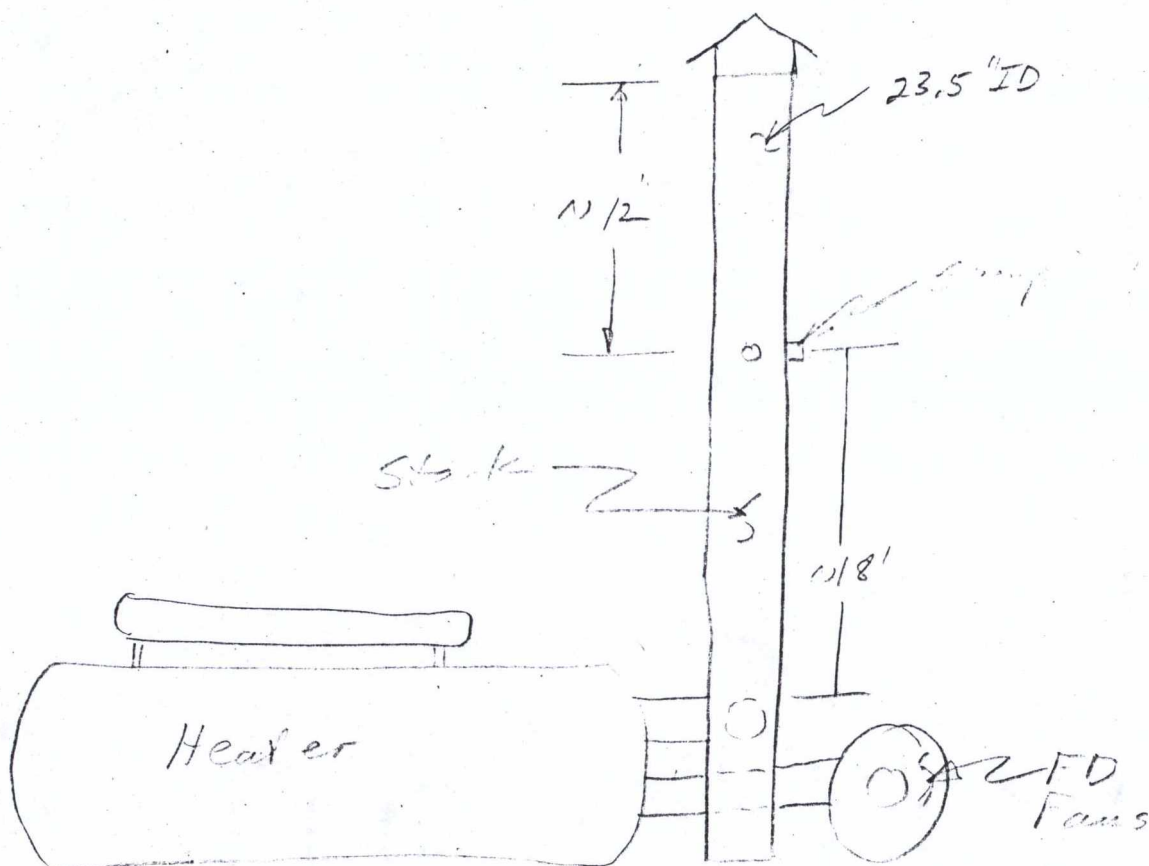
Emission Rates:

Heater DS-1Y	Pollutant <u>NO_x</u>	Actual <u>0.058 lb/10⁶ Btu</u>	Allowable <u>0.10 lb/10⁶ Btu</u>
Turbine CPF-1	Pollutant <u>NO_x</u>	Actual <u>121 ppm @ 15% O₂</u>	Allowable <u>160 ppm @ 15% O₂</u>

CLIENT ARCO
LOCATION Kaparak River
SUBJECT Heater CS-11



PN 3760-1-127 Sheet No. 1
Checked By P. Ross Date 7/19/20
Computed By _____ Date _____



CLIENT ARCO

LOCATION Kapuskasing River

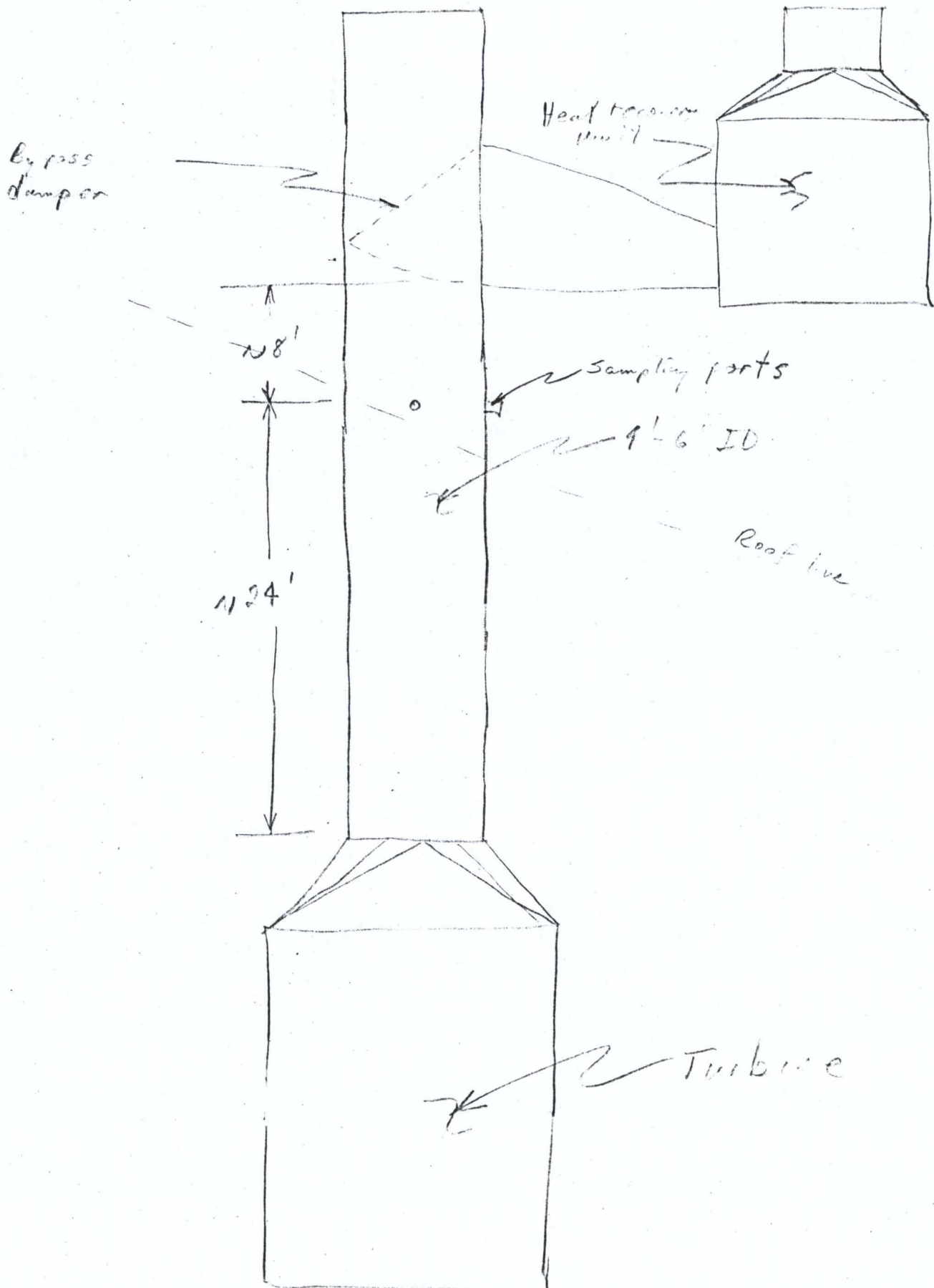
SUBJECT Turbine Chimney



PN 3760-1-122 Sheet No. 1

Checked By R. Ross Date 9/29/83

Computed By _____ Date _____





PHOTOGRAPH 1. Heater DS-Y1.



PHOTOGRAPH 2. Test crew preparing to test Heater DS-Y1. The method 20 sample train is in the back of the Suburban in the foreground.



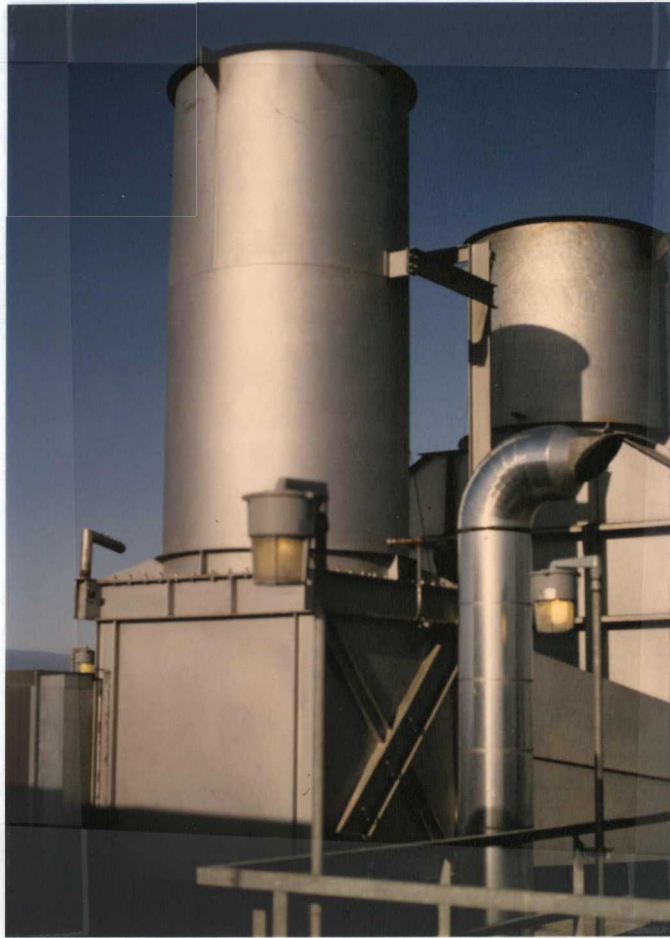
PHOTOGRAPH 3. Four of the 16 well heads at DS-Y1.



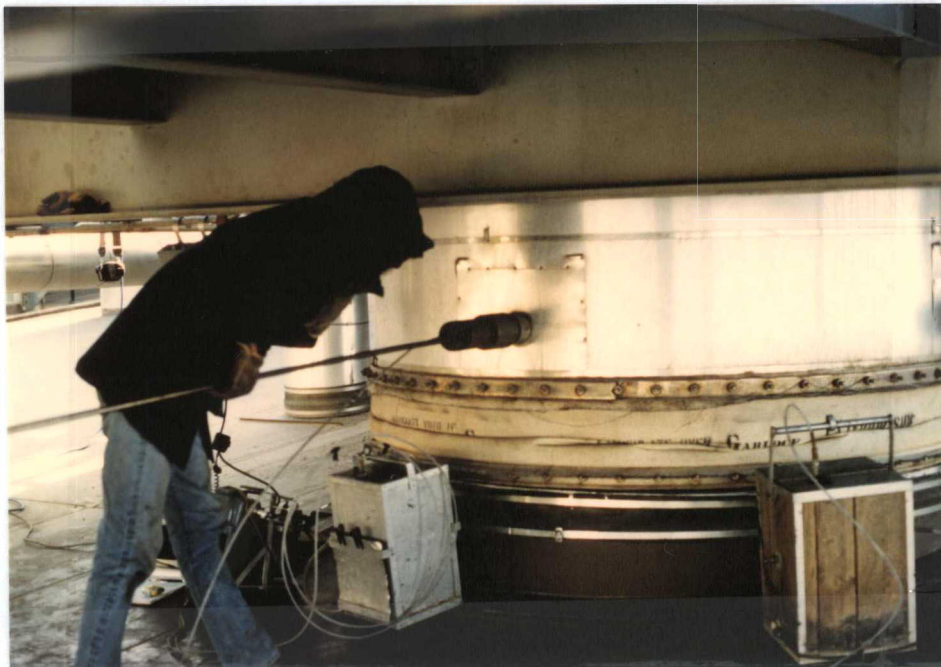
PHOTOGRAPH 4. Part of the Method 20 sample train used by ARCO.



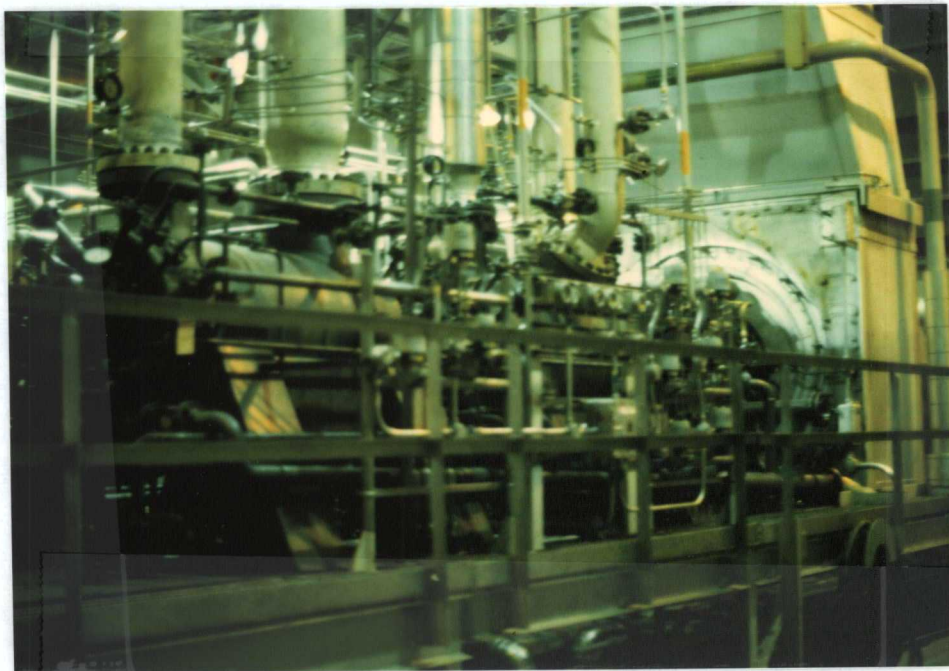
PHOTOGRAPH 5. The heat recovery boiler on the left and the stack bypass damper on the right for Turbine CPF-1.



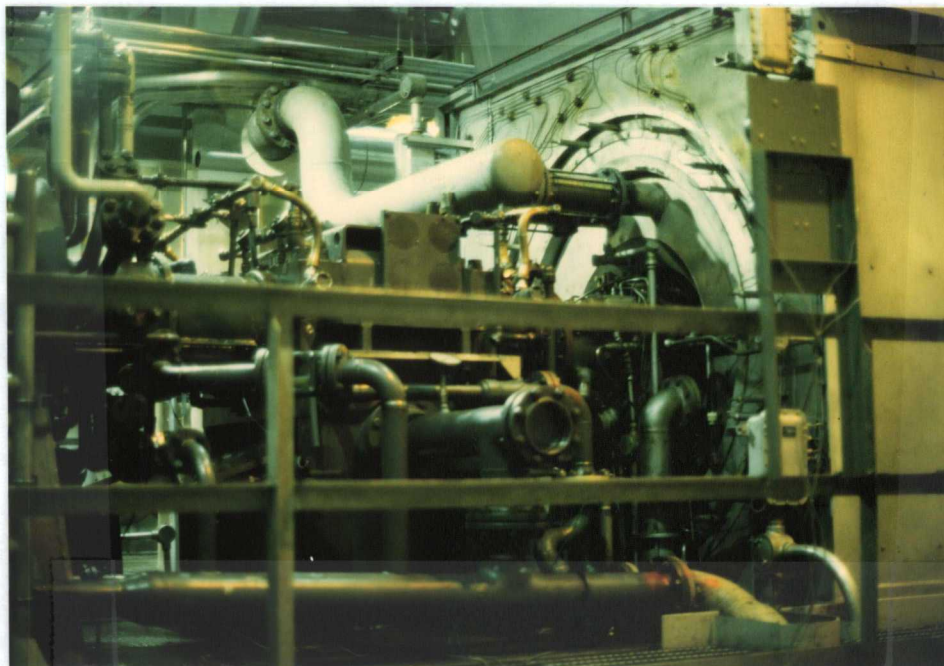
PHOTOGRAPH 6. The bypass stack and damper box in Turbine CPF-1.



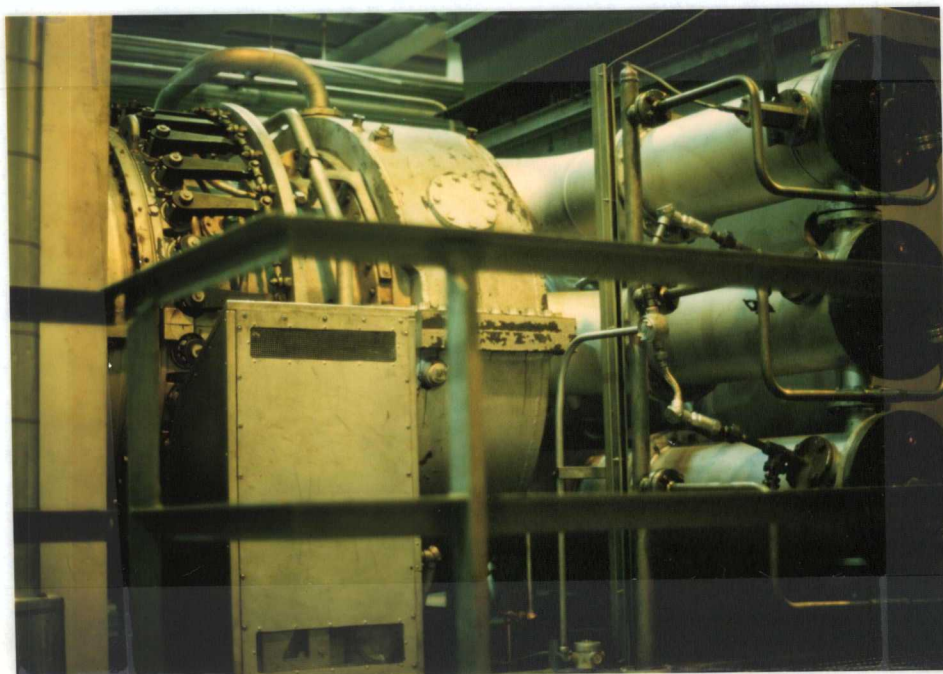
PHOTOGRAPH 7. One of the two test ports
below the bypass damper on Turbine CPF-1.



PHOTOGRAPH 8. The compressor on Turbine CPF-1.



PHOTOGRAPH 9. The turbine and gear on Turbine CPF-1.



PHOTOGRAPH 10. Combustion chamber on Turbine CPF-1.